

WHAT IS CLAIMED IS:

1 1. A pressure-assisted breathing system comprising:
2 a pressure-generating circuit for maintaining a positive pressure within the
3 system;
4 a patient interface device coupled to a patient's respiratory system;
5 a respiratory circuit for providing gas communication between the pressure-
6 generating circuit and the patient interface device; and
7 a nebulizer coupled to the respiratory circuit.

1 2. A system according to claim 1 wherein the pressure-generating circuit
2 comprises a conduit that couples a flow generator with a pressure-regulating device.

1 3. A system according to claim 1 wherein the pressure-generating circuit
2 comprises a first flexible tube and the respiratory circuit comprises a second flexible tube,
3 and wherein the second flexible tube has a smaller diameter than the first flexible tube.

1 4. A system according to claim 3 wherein the second flexible tube is a
2 silicone tube having an outside diameter of 5 mm or less.

1 5. A system according to claim 1 wherein the nebulizer comprises a
2 reservoir for holding a liquid medicament to be delivered to the patient's respiratory system,
3 a vibrating aperture-type aerosol generator for aerosolizing the liquid medicament and a
4 connector for connecting the nebulizer to the respiratory circuit so as to entrain the
5 aerosolized medicament from the aerosol generator into the gas flowing through the
6 respiratory circuit.

1 6 A system according to claim 5 wherein the reservoir has a capacity
2 equal to one unit dose of medicament.

1 7. A system according to claim 6 wherein the reservoir has a capacity of
2 4 ml or less.

1 8. A system according to claim 5 wherein the nebulizer has a net weight
2 of 5 gms or less.

1 9. A system according to claim 8 wherein the nebulizer produces 5
2 decibels or less of sound pressure.

1 10. A system according to claim 5 wherein the aerosol generator has a
2 weight of about 1 gm.

1 11. A system according to claim 1 wherein the nebulizer is located in the
2 direct vicinity of the patient's nose, mouth or artificial airway.

1 12. A system according to claim 11 wherein the respiratory circuit
2 comprises a gas conduit contained within the patient interface device and the nebulizer is
3 integrated with the patient interface device

1 13. A system according to claim 1 wherein the patient interface device
2 comprises nasal prongs, a mask, nasopharyngeal prongs, a nasopharyngeal tube, a
3 tracheotomy tube or an endotracheal tube.

1 14. Apparatus for the delivery of an aerosolized medicament to a patient
2 comprising:

3 a first gas conduit connecting a gas flow generator to a pressure-regulating
4 device to provide a first high-volume gas flow for generating a continuous positive airway
5 pressure;

6 a patient interface device coupled to a patient's respiratory system;

7 a second gas conduit connecting the first gas conduit to the patient interface
8 device for providing a second gas flow to the patient's respiratory system that is lower
9 volume than the first gas flow; and

10 a nebulizer coupled to the second gas conduit for emitting an aerosolized
11 medicament into the second gas flow.

1 15. Apparatus according to claim 14 wherein the second gas conduit has
2 an outside diameter less than the first gas conduit.

1 16. Apparatus according to claim 15 wherein the second gas conduit is a
2 flexible silicone tube having an outside diameter less than 5 mm.

1 17. Apparatus according to claim 14 wherein the nebulizer has a net
2 weight less than 5 gm and produces less than 5 decibels of sound pressure..

1 18. Apparatus according to claim 17 wherein the nebulizer comprises a
2 reservoir having a capacity equal to one unit dose of medicament..

1 19. A CPAP device comprising:
2 a source of pressurized gas;
3 a mask coupled to the respiratory system of a patient;
4 a flexible tube connecting the source of pressurized gas to the mask; and
5 a nebulizer coupled to the mask and adapted to emit aerosolized medicament
6 in close proximity to the patient's nose and/or mouth.

1 20. A method of respiratory therapy comprising the steps of:
2 providing a pressure-assisted breathing system having a pressure-generating
3 circuit and a respiratory circuit coupled to a patient interface device, the pressure-generating
4 circuit having a higher volume flow of gas than the respiratory circuit; and
5 introducing an aerosolized medicament only into the flow of gas in the
6 respiratory circuit to deliver the medicament to the patient's respiratory system.

1 21. A method according to claim 20 wherein the aerosolized medicament
2 is introduced by a vibrating aperture-type nebulizer coupled to the respiratory circuit.

1 22. A method according to claim 21 wherein the nebulizer comprises a
2 reservoir having a capacity equal to one unit dose of medicament and substantially all of the
3 contents of the reservoir is delivered to the patient's respiratory system without the need to
4 replenish the reservoir.

1 23. A method according to claim 22 wherein the dose is 4 ml or less of
2 medicament.

1 24. A method of delivering a surfactant medicament to a patient's
2 respiratory system which comprises the steps of :
3 providing a pressure-assisted breathing system having a pressure-
4 generating circuit, a respiratory circuit coupled to a patient interface device and a vibrating
5 aperture-type nebulizer coupled to the respiratory circuit;
6 introducing a liquid surfactant into the nebulizer;
7 aerosolizing the surfactant in the nebulizer ; and
8 entraining the aerosolized surfactant into the respiratory circuit,
9 whereby the patient breathes the aerosolized surfactant through the patient interface device.

- 1 25. The method of claim 24 wherein the surfactant is a phospholipid.
- 1 26. The method of claim 24 wherein 6-18% of the aerosolized surfactant is
- 2 delivered to the patient.
- 1 27. The method of claim 24 wherein one unit dose of medicament is
- 2 introduced into the nebulizer and the entire dose is delivered to the patient.
- 1 28. The method of claim 24 wherein the dose is equal to 10 mg or less of
- 2 surfactant.